



## TELEVISION

**Thanks to technical advances hastened by the war, this new industry is just about ready to provide jobs and entertainment for thousands of Americans.**

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**S**CHENECTADY, N. Y.—There's a two-story brick building here where you can get a sneak preview of what may one day be the biggest show on earth—television.

Loll around for an hour in the 40-by-80-foot studio of General Electric's television station WRGB. Actors are rehearsing on compact stage sets before two or three cameras dollying in and out for close-ups and long shots. There's a Buck Rogers look about a television camera. You've strayed into a world that seems to combine everything in show business and all the developments in electronics.

From the studio floor you get the notion that television is just like making movies, but once you're inside the control room you know better. Television is more intricate and more exacting.

In making a movie you may shoot boy getting girl on Monday and boy meeting girl on Tuesday. Then you splice it together right-end-to on Wednesday, and anything you don't like you cut out and shoot again on Thursday. In television there are no retakes. You cut as you go. It's got to be right the first time.

Television was about ready for immediate commercialization when Pearl Harbor forced the industry to mark time, but engineers agree that the war has hastened electronic developments to a point that could not have been expected for 15 years under normal circumstances.

You'll have plenty of chance to play with this war baby. You may want to adopt it for your own and grow up with it economically.

By the time war came, 7,000 American families owned receiving sets on which they saw and heard several hours of television each week. The screens were up to 11¼ by 15 inches, and unless you crawled right on top of the machines, you couldn't tell that the flickerless pictures were



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formed by 525 lines of light sweeping across the face of the screens 30 times a second.

That degree of near-perfection was the product of 60 years of electrical experimentation, using the principle that you have to break up the picture into small elements and transmit them one at a time. A metal scanning disc with holes in a spiral pattern gave way to a cathode-ray tube with a fluorescent screen giving off light wherever struck by electrons generated within the tube. This tube became the receiving "screen" of visual broadcasting, the kinescope. Meanwhile Dr. Vladimir K. Zworykin patented the iconoscope, a dipper-shaped glass tube which translates into electrical currents any light images focused on an enclosed sensitized plate. The iconoscope is now the heart of the television camera.

By 1936 Germany was experimenting with a long-distance telephone-and-television set-up. England was peddling receivers and by the time war began had 40,000 sets that were tuning in on daily telecasts. And Scophony Ltd. was projecting televised news events onto screens in London movie houses, translating television impulses into supersonic waves that gave enlarged images up to 20 feet in width. The Scophony Corporation of America was formed in 1943.

The first big-scale experimental television in the U.S. began in 1929 when RCA televised events from the New York World's Fair. After taking a look at these transmissions, the Federal Communications Commission recommended that experiments should continue until September 1940 before any decisions were reached about commercial television.

By December 1941, nine television stations in five cities held licenses for commercial operation. They were NBC, CBS and the Allen B. DuMont Laboratories in New York; the Zenith Radio Corporation, and Balaban & Katz in Chicago; the Don Lee System and the Paramount Television Productions in Los Angeles; the Philco Radio Corporation in Philadelphia, and the General Electric station here in Schenectady. At that time there were 900 radio-broadcasting stations, including 46 FM (frequency-modulation) stations.

According to Lt. Gen. James G. Harbord, chairman of RCA's board of directors, production of radio-electronic equipment for the United Nations' armed forces now totals \$250 million a month. That leaves very little of the necessary materials around for civilian use, but it means a lot of practical experience will be gained in the use and development of electronic devices. And thousands of men who will be valuable to post-war television are being trained.

**W**HILE these technical advances have been made, there is a commercial rivalry going on that threatens to stymie the industry's progress. CBS claims that equipment designed by its engineers will give better television pictures, including color, than anything on the market. There's one drawback. The CBS process will work only in the ultra-high frequencies of the broadcast spectrum, and none of the equipment already manufactured or planned by any other television outfit is capable of transmitting or receiving signals in the ultra-high frequencies.

CBS has asked the FCC to boost all television broadcasting into 31 channels, each 16 megacycles wide, in the UHF above 300 megacycles, and to withdraw permission for television to operate in lower frequencies. RCA and DuMont have countered with requests that post-war television be assigned to 26 channels, each six megacycles wide, within the present range of frequencies.



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(There are only 18 channels allocated to television right now.)

CBS, describing UHF as the "natural habitat" of television, says old equipment should be scrapped right now. About \$22 million has been invested in television in the U. S. already, and CBS is afraid that, if the industry continues to operate in the present range for a few years, so much more cash will be sunk in it that better television will be sacrificed for dirty old money.

Opponents of the CBS proposal say Columbia has the smallest stake in present-day television, that the superiority of UHF transmission has not been proven and may not be for years, and that the shift can be made to the upper spectrum any time, if and when experiments warrant.

The FCC, with more than 80 applications for television permits and 50 for FM stations on hand, will make the decision. Probably the heavy investments will not be ignored, and television will continue in the same frequencies for some time if only to make sure that the industry gets a foothold right after the war.

There's another conflict going on at the same time—a smaller one, in which the opponents are the movie people and the radio people.

For a long time a lot of movie moguls have tried to pretend there is no such thing as television, but they're not playing ostrich anymore. Earle G. Hines, director of Scophony, contends that the movies have the most to offer television. He says the only thing that gives the radio industry the inside track is its technical knowledge of television's apparatus.

Both 20th Century-Fox and Paramount own pieces of Scophony. Paramount shares heavily in the DuMont television interests and has its own stations in Hollywood and Chicago.

Ralph B. Austrian, executive vice-president of the RKO-Television Corporation, thinks the motion-picture industry will absorb television because the movies can shell out more money for exclusive coverage of special events than radio broadcasters could afford. There are 18,000 movie houses that can seat 11,700,000 people in 1,015 cities of the U. S. These theaters take in about \$150 million per month. In two months, their paid admissions equal the revenue from a whole year of radio broadcasting.

If the movies decide to televise special events as part of their regular screen fare, "no sponsor of telecast programs could afford to meet the ante of the movie exhibitors," Austrian says. "Madison Square Garden would become merely a studio in which to provide a ring, some lights and a few thousand witnesses to boxing matches. Millions of fight fans in theaters around the country would make up the Garden's real audience—not the favored few in the \$27.50 ringside seats." The same goes for the Kentucky Derby, the World Series and all the rest.

In turn, television broadcasters plan to put movie film to their uses, both as straight program material and for special effects. Most outdoor and action scenes for television dramas or educational programs will probably be filmed. On your home television screen you'll see a murderer leave his victim and climb out a window. That will be studio stuff. In the next scene, the murderer escapes in a long black limousine that crashes into a store front and goes up in flames. That'll be film, photographed especially for the production and dubbed in at the right moment in the broadcast. It's going to leave television studio audiences, who see only the action on the sound stage, a little bewildered sometimes.

Eventually television may be able to absorb 20



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times the present film output of the motion-picture industry. Film that is shot especially for television will require distinct techniques. You'll see fewer long shots and scenes with masses of people, because the television screen is so small that it loses detail in anything beyond a "medium" shot. And films, as well as all other television programs, will have to be edited for home-and-family consumption. A television actor is never playing to an audience. He is performing for a small group of people—including women and children—in their own living room. He mustn't overplay or use certain words.

**T**ELEVISION may bring a blessed end to the over-ripe announcer who throws himself into a genteel tizzy over a jar of face cream or some irresistible cure-all. Very few announcers could read that stuff with a straight face if they knew they were seen as well as heard. Television may also mark the passing of crooners and the return of singers, because some of the current swoon sensations couldn't make themselves heard if the mike was a few feet above their heads, out of range of the camera.

The expansion of television doesn't mean standard broadcasting will have to throw in the sponge. There are a lot of chores around the house, and the average housewife won't be able to sit around with her eyes glued on a little screen. While she does her dishes and mending, she'll keep on listening to Just Plain Homer Cromer's Second Wife.

Television programmers realize that the mere addition of sight to sound doesn't mean that a program will be better. Sixty percent of today's radio programs are largely musical, and most people don't enjoy just looking at an orchestra—unless it's Phil Spitalny's all-girl ensemble. So it may not be worth the added expense to televise straight orchestral programs.

Television cannot be simply visual radio, televised stage plays or movies flashed into the home. "What we are doing today in television," says Hoyland Bettinger, WRGB's manager, "is merely piling up evidence that better things are possible. We must feel around and suit our programs to the medium, not superimpose the techniques of other media on television."

Television is hampered at the moment by technical obstacles that may vanish when strategic materials are available. Programs with the best audience reactions so far are variety shows, comic opera and character dramas. News broadcasts with animated maps, sports like the Army-Notre Dame game, and election-night box scores such as CBS and several other studios televised are also regarded as good television.

In October the DuMont station, WABD, in New York staged the first full-length musical comedy written for television—"The Boys from Boise," sponsored by *Esquire* magazine.

These wartime programs have ironed out many bugs. Directors have learned that it is better not to use many blondes in a cast; they create mild electronic disturbances. And the heat from lights during camera rehearsals and broadcasting bothers violinists because their strings expand out of pitch. If you have a scene in which a character must eat ice cream under the lights—which sometimes kick out 120 degrees in the middle of a program—you simply serve him a dipperful of mashed potatoes. WRGB beats the heat problem with water-cooled mercury-vapor lights.

Television's performers are coming from everywhere—stage, screen and radio actors, the garage



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Television-builder Bill Still holds an iconoscope.

mechanic down the street, the high-school girl who stays with your baby while you take your wife to the movies.

**A**t least one outfit will produce a television show on 24 hours' notice—the Television Workshop in New York, which can supply everything from an author to a suit of armor on request. The Workshop has put on 100 shows in a year, ranging all the way from Shakespeare to the bloodiest whodunits.

Some of the shows staged by the Workshop now for \$250 may cost up to \$20,000 after the war. Irwin Shane, head of the Workshop, says that right now performers are anxious to work and will accept small pay for a chance to crack television. Most studios don't charge for air time now, either. NBC's pre-war rate was \$270 an hour, \$150 a half hour and \$90 for 15 minutes. Similar rates will probably prevail again, and a television sponsor will have to hire talent on top of that. "The Boys from Boise," for instance, reportedly cost *Esquire* \$15,000 to produce at WABD, with no charge for air time.

Television sponsors who want their programs on film, so they can be used more than once or in different parts of the country, will probably have to pay as much as those hiring live-talent shows—an estimated minimum of \$1,000 a screen-minute for a first-class television film.

But big advertisers, accustomed to high-price radio programs, no longer faint when \$25,000 is mentioned for a half-hour show, so one of these days television will probably be urging you to buy soap, tires, cars and to drive to Florida for the winter. NBC has televised more than 125 commercial programs and claims that television advertising will prove 10 times more effective than all other methods combined. Soon you will see as well as hear Johnny paging Philip Morris, and Aunt Jemima will step right off the side of the box and fry up some pancakes before your eyes.

Joseph M. Guilfoyle, writing in the *Wall Street Journal*, reported that manufacturers would be ready to roll out television sets within six to nine months after the War Production Board gives them the green light. You'll be able to get a table model for \$125 up. Console models, with television, AM, FM, short-wave bands and a record player, will sell for \$225 to \$1,000.

If you're interested in the other end of the

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business—operating your own television station—you'll be able to set yourself up with two to five cameras, two movie channels, a 40-kw video transmitter, a 20-kw audio transmitter and all necessary operating equipment for \$300,000. It will cost you \$117 an hour to keep that rig on the air eight hours a day, seven days a week, according to James D. McLean, television sales manager for GE. For as low as \$48,000, you can set up a satellite station having low-power transmitters but no equipment for originating "live" programs of your own.

Bill Still, a 30-year-old Negro in Jamaica, N. Y., is equipping a small television station with a 17-by-25-foot studio for only \$20,000, by building everything himself.

"Jeep" transmitters will probably be in wide use by department stores, Irwin Shane says. You can have 50 screens scattered throughout your store and catch the eye of your customers with "live" ads of anything you're trying to plug. Your transmitter, two cameras, studio equipment and screens will run about \$100,000.

The brightest image on television's post-war screen is the employment picture. According to Thomas F. Joyce, general manager of RCA's radio-phonograph-television division, there will be 600,000 employed directly by the radio-television industry by the end of the fifth year of full commercialization. This includes manufacturers, dealers, broadcasting stations, commercial communications, service- and repairmen, and cabinet manufacturers. That's about double the number employed when radio was operating alone before the war.

Paul Hoffman, chairman of the board of the Committee for Economic Development, believes that within 10 years after television hits its stride, the resulting increase in demands for goods and services in all economic fields will create 4,600,000 new jobs. GIs now working with radar and other electronic instruments especially will be in demand for television jobs.

**H**ow soon television really gets into long pants depends on 1) the sale of receiving sets, 2) the reaction of advertisers to televised commercials and 3) the establishment of network television.

R. L. Smith, superintendent of technical operations here at WRGB, considers the third factor the most important. He thinks that, once you have successful network transmission, sets will sell readily and advertisers will become more interested in television as the number of their prospective customers increases.

The problem of network transmission isn't licked yet, but engineers are working on it. NBC has asked the FCC for stations in Washington, D. C., Chicago, Denver, Cleveland, San Francisco and Los Angeles as regional network "feeders."

Two methods of relaying the television signal—which travels only tangent to the earth's curve by line of sight to the horizon—have proved successful. One of these is transmission by coaxial cable, which carries the television impulses by wires centered in metal tubes. Coaxial cable costs about \$10,000 a mile to install. The second method is by radio relay. A radio relay is an unattended low-power transmitter operating in the UHF bands. It is mounted on a 200-foot tower with a highly directive antenna that beams a signal to another relay station 25 to 30 miles away. The second station, equipped with a highly directive receiving antenna pointed toward the first station, is connected with an amplifier. The amplifier in turn connects with another transmitting antenna for further relaying of the signal.



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By means of radio relays, the station here in Schenectady regularly rebroadcasts television programs originating in New York City. Philco "bounces" programs into Philadelphia from New York the same way. American Telephone and Telegraph has permission to put up relay points between New York and Boston. Philco has the FCC's okay to construct seven mobile relays for use between Washington, D. C., and Philadelphia, and hopes to televise the inauguration of the President Jan. 20, 1945.

Television has a long history of promises, but you have only to look around here at Schenectady to know that if the industry can live peacefully in its own house, the promises will be kept.



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